



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/049,830	02/19/2002	Kenji Tsukada	Q67368	6300
7590	09/01/2004		EXAMINER	
Sughrue Mion Zinn Macpeak & Seas 2100 Pennsylvania Avenue NW Washington, DC 20037-3202			DUDDING, ALFRED E	
			ART UNIT	PAPER NUMBER
			2853	

DATE MAILED: 09/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/049,830	TSUKADA ET AL.
	Examiner	Art Unit
	Alfred E. Dudding	2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 13 July 2004.

2a) This action is **FINAL**.                                   2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-44 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) 1-25,28-36 and 39 is/are allowed.

6) Claim(s) 27,37 and 40-43 is/are rejected.

7) Claim(s) 27 and 44 is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 19 May 2002 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All    b) Some \* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) Notice of References Cited (PTO-892)  
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/16/03, 4/5/2004.

4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.

5) Notice of Informal Patent Application (PTO-152)  
6) Other: \_\_\_\_\_.

**DETAILED ACTION*****Claim Rejections - 35 USC § 103***

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 26, 37, and 40 - 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook (U.S. 6,155,664 A)) in view of Anderson et al. (U.S. 6,044,694 A).

Cook discloses a printing apparatus and a method of controlling an ink jet recording apparatus on which a liquid container is able to be detachably mounted, Figure 1, element 2 (printhead cartridge), said liquid container having a container body containing liquid ink supplied to a recording head discharging an ink droplet from a nozzle opening, Figure 1, element 24 (printhead), a liquid supplying opening for supplying said liquid outside of said container body, Figure 1, (as evidenced by supply line 7).

Cook fails to teach the claimed invention of a controller detecting an oscillation characteristic value of at least a first piezoelectric device coupled to the liquid container and a second piezoelectric device coupled to the liquid container; determining an amount of liquid consumed from the liquid container based on a first oscillation characteristic value of the first piezoelectric device and a second oscillation characteristic value of the second piezoelectric device or that the piezoelectric device is positioned just below an initial liquid level of said liquid.

Anderson et al. disclose plural piezoelectric devices for detecting said liquid within said container body, Figure 2, elements 50, 52, and 54 (piezoelectric detectors), comprising the steps of detecting a characteristic value of said piezoelectric device by a detection section provided inside or outside of said ink jet recording apparatus (Figure 2 shows bender portion of the piezoelectric detector inside the container), Column 2, lines 28 – 52 (characteristic of the piezoelectric detector), judging whether or not said characteristic value satisfies a predetermined condition by a judging section provided inside or outside of said ink jet recording apparatus, Abstract, lines 8 – 11. Anderson et al. teach a method of controlling an ink jet recording apparatus, wherein said

characteristic value is an element characteristic value of a piezoelectric element of said piezoelectric device, Column 2, lines 34 – 42 cite measuring frequency, impedance, rest oscillating properties, and Q characteristics of the piezoelectric detection device. Anderson et al. discloses wherein said detection section detects oscillation characteristic values of said at least two piezoelectric devices in said detecting step, and wherein said judging section judges a consumption state of said liquid within said liquid container based on a relative condition of mutual oscillation characteristic values of said at least two piezoelectric devices in said judging step, Column 4, lines 4 – 15. Anderson et al. teach that said additional piezoelectric device is positioned nearby a bottom surface of said container body, Figure 2, element 50, clearly seen. Anderson et al. teach that said additional piezoelectric device is positioned nearby said piezoelectric device, an initial liquid level when said liquid within said container body is not consumed being located between said piezoelectric device and said additional piezoelectric device, Figure 2, element 32 (liquid), elements 50 and 54 (piezoelectric detectors). Anderson et al. disclose that an oscillating section of the piezoelectric device is positioned just below an initial liquid level of said liquid, Figure 2, element 54.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the piezoelectric detector of Anderson et al. in the recording apparatus (ink jet printer of Cook. in order to detect ink levels, viscosity and density of the ink, and shutting down printing operations to prevent possible damage to a printhead.

***Allowable Subject Matter***

3. Claims 27 and 44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

a. A search of prior art did not cite an ink cartridge wherein said piezoelectric device has a vibrating portion which comes into contact with said ink in said container body via an opening, said opening defining an area of said vibrating portion as claimed in the limitations of claims 27 and 44.

4. Claims 1 – 25, 28 – 36, 38, and 39 are allowed.

a. The primary reason for the allowance of claims 31 and 32 is the inclusion of the method step of controlling an ink jet recording apparatus on which a liquid container is able to be detachably mounted, wherein the piezoelectric device comprises a vibrating portion that contacts liquid in the liquid container via a cavity of the liquid container, and wherein the vibrating portion covers an outer opening of the cavity. It is this step found in each of the claims, as it is claimed in the combination, that has not been found, taught, or suggested by the prior art of record which makes these claims allowable over the prior art.

b. The primary reason for the allowance of claims 33 and 34 is the inclusion of the method step of controlling an ink jet recording apparatus, on which a liquid container is able to be detachably mounted, wherein the characteristic value is detected when the liquid container is being mounted on the ink jet recording apparatus.

c. The primary reason for the allowance of claims 35 and 36 is the inclusion of the limitation of an apparatus for controlling an ink jet recording apparatus on which a liquid container is able to be detachably mounted, wherein the piezoelectric device has a vibrating portion that contacts liquid in the liquid container via a cavity of the liquid container, and the vibrating portion covers an outer opening of the cavity.

d. The primary reason for the allowance of claims 38 and 39 is the inclusion of the limitation of an ink jet recording apparatus on which a liquid container is able to be detachably mounted, wherein the piezoelectric device has a vibrating portion that contacts the liquid via a cavity in the liquid container, and wherein the vibrating portion covers an outer opening of the cavity.

*Response to Arguments*

5. Applicant's amendments filed 13 July 2004 have overcome the prior art. However, the argument that Anderson et al. does not cite measuring a characteristic of the residual oscillation is overcome by Column 2, lines 35 – 40 of the '694 reference Anderson et al. in combination with Cook has been used to reject the newly added claims 26, 37, and 40 – 43.

*Conclusion*

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.



Stephen D. Meier  
Primary Examiner

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alfred Dudding whose telephone number is (571) 272-2144. The examiner can normally be reached on Monday-Friday from 7:00 AM to 3:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier, AU 2853, can be reached at (571) 272 - 2149. The fax phone number for this Group is are (703) 872-9306. The examiner's fax phone number for unofficial correspondence is (571) 273-2144

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist whose telephone number is (703) 308-0956.



Stephen D. Meier  
Primary Examiner

Alfred Dudding

AD

8/31/04